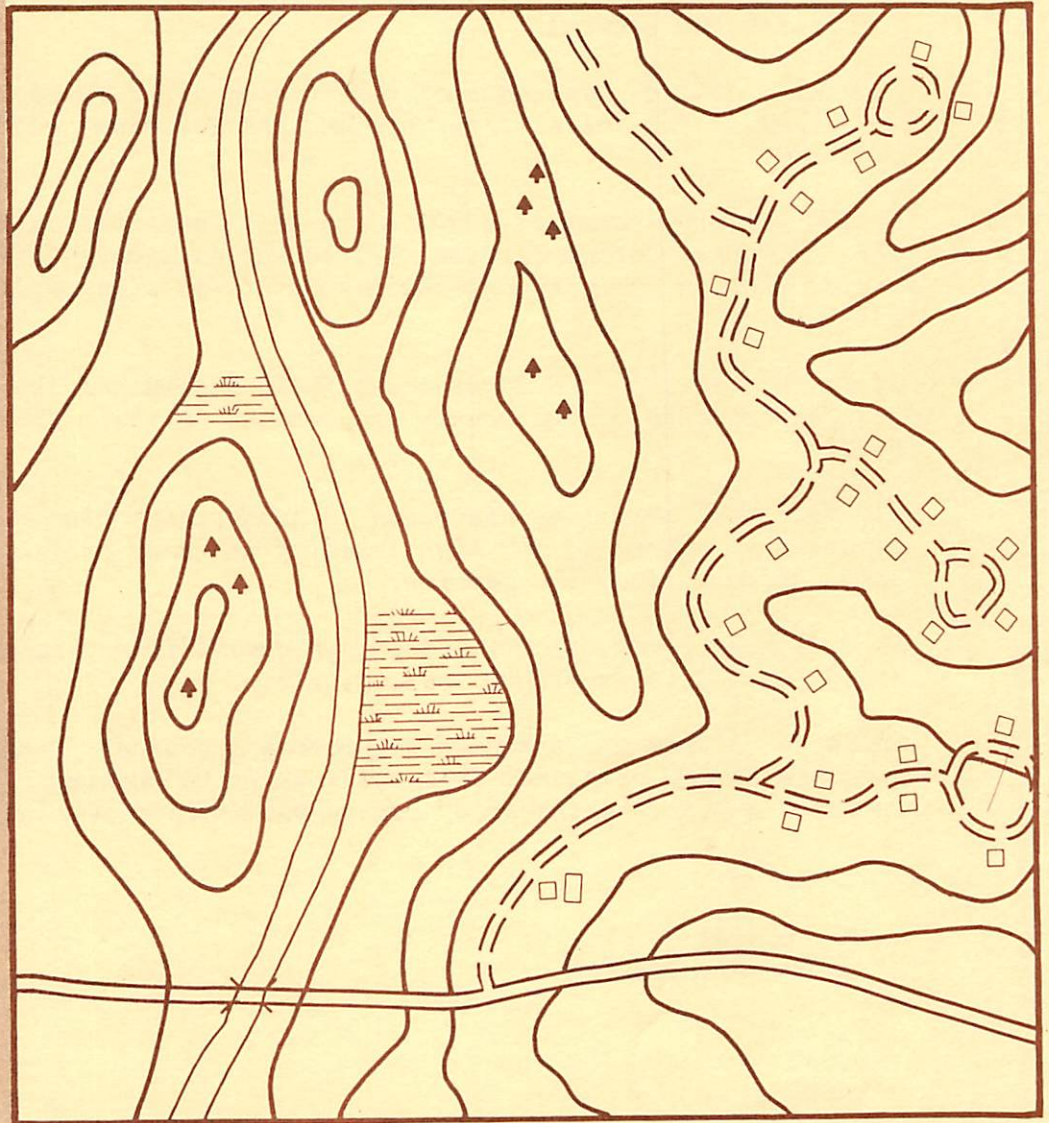


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**FOR  
REVIEWING  
SUBDIVISION  
PLANS  
IN  
COLORADO**



U.S. Department of Agriculture  
Soil Conservation Service  
Denver, Colorado  
April 1973

M7-L-22898



## FOREWORD

Recent Colorado legislation (Senate Bill 35) requires the establishment of County Planning Commissions and the formulation of county subdivision regulations.

Guidelines for county regulations have been distributed by the Colorado Land Use Commission to all Colorado counties in the form of Model Subdivision Regulations for Counties.

The model regulations require county planning commissions to submit all preliminary subdivision plans to Soil Conservation Districts for review and comment.

Several required components of subdivision plans relate to Soil Conservation Service soil surveys and conservation practice specifications.

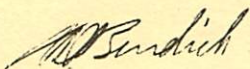
As the primary technical advisors to Soil Conservation Districts, the Soil Conservation Service will be called upon by districts to assist them in carrying out their subdivision plan review responsibilities.

It is important that SCS personnel fully understand the provisions and requirements of the county regulations in their area of responsibility.

All personnel assisting districts in subdivision plan review will be expected to adhere to the high level of unbiased professional competence expected from the Service.

We must make every effort, within our capabilities, to assist districts with this important responsibility.

These guidelines are intended to provide a source of information and guidance to SCS personnel that will result in meaningful comments compatible with the intent of county subdivision regulations.



M. D. Burdick  
State Conservationist





*A subdivision site with severe slope limitations.* SCS PHOTO 6-1173-15

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## 100 INTRODUCTION

### 110 Purpose

The purpose of this document is to provide Soil Conservation Service personnel with guidelines for use in assisting Soil Conservation Districts to carry out their responsibilities in reviewing and preparing comments for county planning commissions relative to preliminary subdivision plans.

These guidelines have been developed in accordance with provisions included in *Model Subdivision Regulations for Counties*, Colorado Land Use Commission, June 1972. It is recognized that county regulations may vary from one county to another, but by statute the requirements of Article 2, Chapter 106, Colorado Revised Statutes as amended must be met by every county. Since some counties may elect to incorporate more stringent requirements into county regulations than appear in that article, the county regulations should be consulted to determine review and comment requirements.

Technicians assisting SCD boards of supervisors must keep in mind that subdivision regulations require review and comment from the SCD and not from SCS. The role of SCS is advisory. As technical consultants to the SCD, Service responsibility is to provide the SCD with the best information available to evaluate the adequacy of subdivision plans as prescribed in the county subdivision regulations.

All comments to the county planning commission will be made by the SCD. Since SCD's will rely heavily on SCS data to make decisions regarding the adequacy of plans reviewed, it is imperative that data supplied by SCS is factual, reliable, and defensible.

It is to assure high quality appropriate assistance from SCS to the SCD that these guidelines have been prepared.



*Destruction of native vegetation will cause dust storms and gully erosion.* SCS PHOTO 10-PI493-13

Provisions for referral and review of preliminary subdivision plans as mandated by Senate Bill 35 and incorporated in the Model Regulations provided for review by various organizations having diverse areas of expertise.

\* Counties are required to refer plans to such organizations as utility, local improvement, and service districts, ditch companies, the Colorado Forest Service, Department of Health, State Engineer's Office, etc., as deemed appropriate.

\* The regulations further imply that all preliminary subdivision plans will be referred to school districts, Soil Conservation Districts, nearby municipalities, other planning commissions having jurisdiction, and the Colorado Geological Survey.

Two broad parameters upon which SCD's are expected to comment are specified. These are soil suitability and flooding problems.

Because of the broad nature of these parameters, some overlap with comments from other reviewing organizations must be expected. It is important that SCD comments based on SCS data be limited to those areas for which SCS has expertise and for which comments are requested or specified in the county regulations. As appropriate, some degree of coordination with other organizations making reviews may be desirable.



*This soil has severe limitations for a building site.* SCS PHOTO 3-7379





*An inadequate drainage system causes problems.* SCS PHOTO 11-P-490-3

Sections 200 through 600 of these guidelines are intended to describe those areas of concern for which SCD's have review responsibility and for which SCS can supply adequate information.

Soil suitability examination will involve all proposed uses of land included in the preliminary plan.

Detailed guidelines concerning the use of soils interpretive data will be found in the appropriate sections of this document.

Comments concerning flooding problems will include both on and off site effects. Detailed guidelines for flood problem examination will be included primarily in Sections 300 (Flooding) and 400 (Engineering).

According to the Model Regulations, an Erosion Control Plan is required in the preliminary plan if its need is determined by the planning commission. All plans received will need an appraisal concerning the need for an erosion control plan if one is not included and the adequacy of the Erosion Control Plan if included with the plan. Detailed guidelines concerning erosion control plans will be found in Section 600 (Erosion Control Plans).

Section 700 (Comment Preparation) provides guidelines for the preparation of review data supplied to SCD's and suggestions for assisting SCD's with the preparation of comments to the planning commissions.

The appendix will include reference material that might be helpful and is pertinent to the review process.

## 200 Soils

### 210 General

The soil survey is an inventory consisting of soil maps, soil descriptions, and soil interpretations.

Soil maps comprise a record of the location and extent of different kinds of soil plotted on an aerial photograph base. Delineated areas on a soil map, identified by a map symbol, are known as mapping units and may consist of a single kind of soil or a combination of two or more kinds of soils.

Soil descriptions comprise a record of observed characteristics and qualities. One part of the soil description is generally referenced to a representative or typical soil profile at a specific location in the landscape. A second part generally describes how and where areas of this kind of soil, mapping units, fit into the landscape.

Soil interpretations are statements about hazards and limitations of soils with respect to location of community facilities, the suitability of soils as source materials, and the suitability of soils for such uses as cropland, rangeland, and woodland. Soil interpretations are presented in several different ways depending on the needs of the user. The most common of these is a form entitled SOIL SURVEY INTERPRETATIONS (SCS-SOILS-5). Soil interpretations are prepared as an interdisciplinary effort involving soil scientists, plant scientists and engineers.

### 220 Review Procedure

1. Have all characteristics and qualities of the soils that affect their suitability and limitations for various uses been considered?
2. Does the plan provide suitable alternative methods of treatment or design to overcome limitations?

### 230 Soil Characteristics and Qualities Considered

Those soil features that are considered in evaluating soils and sites for various uses are shown in the following table. The relative importance of individual soil characteristics and qualities varies from one use of the soil to another.



**SOIL FEATURES AFFECTING**

Depth to Bedrock  
 Depth to Watertable  
 Thickness of Material  
 Texture  
 Coarse Fragments Surface  
 Coarse Fragments in Soil  
 Rockiness Class  
 Stoniness Class  
 Slope  
 Permeability  
 Hydraulic Conductivity  
 Percolation Rate  
 Flooding  
 Drainage Class  
 Frost Action Class  
 Shrink-Swell Potential  
 AASHTO Classification  
 Unified Classification  
 Corrosivity  
 Salinity  
 Erosion Hazard  
 Organic Matter Content  
 Consistence (Wet)

**LAND USE**

**SANITARY FACILITIES**

- Septic Tank Absorption Fields
- Sewage Lagoons
- Sanitary Landfill (Trench)
- Sanitary Landfill (Area)
- Daily Cover for Landfill

**COMMUNITY DEVELOPMENT**

- Shallow Excavations
- Dwellings without Basements
- Dwellings with Basements
- Small Commercial Buildings
- Local Roads and Streets

**RECREATIONAL DEVELOPMENT**

- Camp Areas
- Picnic Areas
- Playgrounds
- Paths and Trails

**SOURCE MATERIAL**

- Roadfill
- Sand
- Gravel
- Topsoil

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
<b>SANITARY FACILITIES</b>																							
Septic Tank Absorption Fields	X	X					X	X	X	X	X	X	?		?						?		
Sewage Lagoons	X	X			X	X			X	X			X				X	X				X	
Sanitary Landfill (Trench)	X	X		X			X	X	X	X			X										
Sanitary Landfill (Area)		X							X	X			X	X									
Daily Cover for Landfill			X	X		X		X	X					X									X
<b>COMMUNITY DEVELOPMENT</b>																							
Shallow Excavations	X	X		X			X	X	X				X	X	?	?					?		
Dwellings without Basements	X	X					X	X	X				X	X	X	X		X					
Dwellings with Basements	X	X					X	X	X				X	X	X	X		X					
Small Commercial Buildings	X	X					X	X	X				X	X	X	X		X					
Local Roads and Streets	X						X	X	X				X	X	X	X	X	X					
<b>RECREATIONAL DEVELOPMENT</b>																							
Camp Areas				X	X		X	X	X	X			X	X									
Picnic Areas				X	X		X	X	X				X	X									
Playgrounds	X			X	X		X	X	X	X			X	X									
Paths and Trails				X	X		X	X	X				X	X									
<b>SOURCE MATERIAL</b>																							
Roadfill			X				X	X		X				X	X	X	X	X					
Sand			X															X					
Gravel			X															X					
Topsoil	X	X	X	X	X	X	X	X	X				X							X		X	X

## 240 Soil Suitability

Soils are rated in terms of suitability as sources of material for:

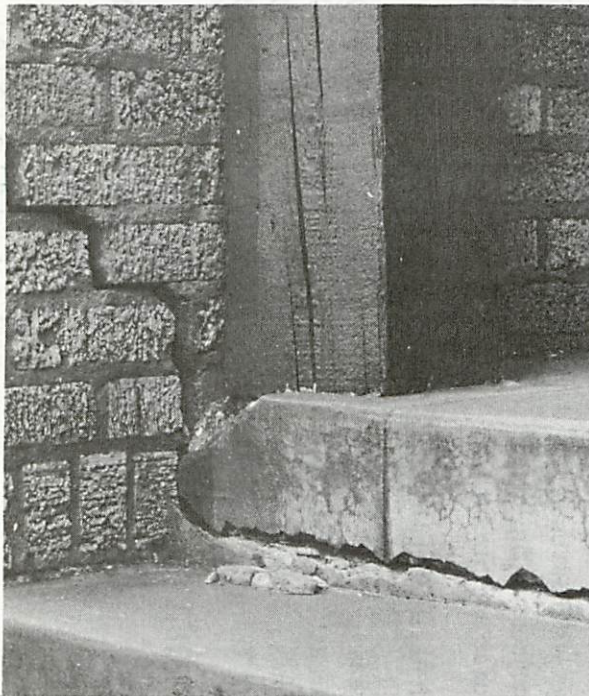
ROADFILL, SAND, GRAVEL, TOPSOIL

Ratings are stated in terms of UNSUITABLE, POOR, FAIR, AND GOOD.

## 250 Soil Limitations

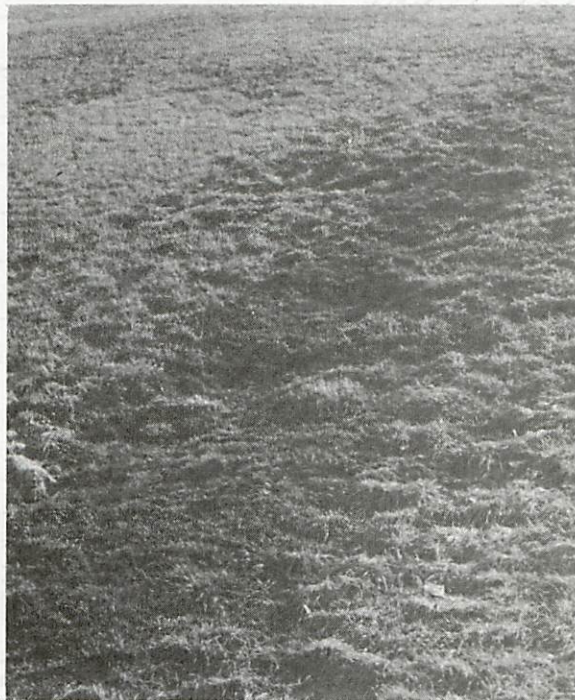
For such uses as location of community, recreational, and sanitary facilities, soils are rated in terms of degrees of LIMITATIONS. These degrees are stated as SLIGHT, MODERATE, or SEVERE. A Moderate or Severe rating may be attributed to a single soil feature that is limiting for a particular use or be the result of a combination of several limiting factors.

It should be noted that with rare exceptions the assignment of a MODERATE or SEVERE rating is not intended to preclude the use of a soil or site for a particular purpose. These ratings are intended to emphasize that these are hazards and limitations to be considered and that alternatives in design and/or treatment are needed to overcome the hazard or limitation. The exceptions are: 1) SEVERE LIMITATIONS for SEPTIC TANK ABSORPTION FIELDS - make it mandatory that they not be installed; and 2) SEVERE LIMITATIONS because of FLOODING preclude some types of sanitary facilities and community development.



High shrink-swell soils cause building failures.

SCS PHOTO 12-P887-1



Sewage effluent rises to surface on soils unsuited for septic tank filter fields.

SCS PHOTO IND-60588





*Drainage and soil suitability are important in road construction.* SCS PHOTO 10-PI479-1

### 260 Criteria for Ratings

The criteria for rating soils for engineering uses, urban and recreational development are given in Guide for Interpreting Uses of Soils, Nov. 1971, and Soils Memorandum - 69, Oct. 17, 1968,



310 General Principles Involved

Colorado SB-35 requires the board of county commissioners to distribute copies of the preliminary plan for a subdivision to the local soil conservation board or boards within the county for explicit review and recommendations regarding soil suitability and flooding problems.

This section of the guidelines deals specifically with flooding. Flooding is defined as--water from a river, stream, watercourse, lake or other body of standing water that temporarily overflows or inundates adjacent lands and which may affect other lands and activities through stage elevation, backwater, and/or increased water.

320 Drainage Systems

Subdivision regulations often make no precise distinction between the terms "flooding" and "drainage". Nevertheless, "flood" and "drainage" standards apply to two somewhat different situations: standards for flood prone areas apply to lands subject to overbank flows of rivers, streams, watercourses, and lakes where the depth, duration, and velocity of inundation are substantial. Standards for drainage refer to the collection, conveying, and disposing of surface runoff from a single property or several properties.

The total drainage system of an urban area includes two drainage systems: the initial system and the major system. The initial system includes storm sewers (open channel and subsurface drains), curbs and gutters, streets, and land grading. Standards for drainage apply to the initial system. The standards vary from community to community according to land use. In general, the subsurface drains are designed to carry the storm runoff expected once each two to ten years. Local runoff from the 10 to 100-year storms is conveyed by way of open channels, streets, natural ground slopes, and land grading.

X The major system is of utmost concern since it consists of floodways and adjacent flood plains which carry the runoff from the 100-year and higher frequency storms. Standards for flood prone areas apply to the major system. The major system because of its location (natural or constructed) should protect the urban area from extensive property damage and loss of life due to flooding. The major system exists in a community whether or not it has been planned and designed, and whether or not development is situated wisely in respect to it. This system includes many features such as streams, natural and constructed channels, and outfalls from initial systems. The major system is closely allied, but separate to the initial system. Both systems should be planned concurrently. A good major system can reduce or eliminate the need of underground storm sewers.





*This bridge couldn't handle increased flow from development area.* SCS PHOTO 10-P810-3

This does not necessarily preclude the use of storm sewers, however, an ill conceived major system could result in the development of a more costly storm sewer system. The primary purpose for the major system is to provide an outlet for floodwater resulting from the 100-year and storms of higher frequencies.

### *330 Flood Plain Evaluation*

The preliminary plan for a subdivision (the plan which the SCD Board is requested to review) requires the subdivider to submit a map showing the location of watercourses and storm drainage systems including culverts. (Note: Detail design of drainage structures are not required for preliminary plan.)

The SCD Board is not specifically required to comment on storm sewers (initial system), however, the total drainage system needs to be considered in the overall evaluation.

On a map or maps at a scale of 1" = 200', the subdivider is required to show the approximate boundaries of areas subject to inundation or storm water overflows of an intensity estimated to occur with a return frequency of once every hundred years. It is these flood plain areas, a part of the major drainage that the SCD Boards are requested to review and in turn, may ask the Soil Conservation Service for technical comments.

"Flood plain" is defined as the relatively flat or lowland area adjoining a river, stream, watercourse, lake or other body of standing water which has been or may be covered temporarily by flood water.

### 340 Review Guidelines

The SCS "Procedures for Determining Peak Flows in Colorado" are to be used in evaluating flood problems. An estimate of the design rate of flow is necessary to determine channel capacity and size. In using the procedures, due consideration should be given to future developments in the watershed. The use of curve numbers below 85 may be adequate for rangeland but could result in too low a runoff figure for subdivisions. High density business and shopping areas commonly have curve numbers of 90 or greater. The time of concentration should be carefully analyzed. A long time of concentration materially reduces the estimated peak flows in comparison to a short time of concentration.

The following are needed for evaluation:

- I. A map or maps showing the following at the scale of 1" = 200':
  - (a) Lot and street layout showing location of pertinent structures, water supply, and sanitary facilities.
  - (b) Existing contours with elevations tied to National Geodetic Survey sea level datum. Contour intervals will vary depending upon predominant ground slope.
  - (c) A generalized grading plan identifying areas of cut and fill and street gradients. The topographic map should show the contours after grading at the same interval as required for existing contours.



- (d) Water courses and proposed storm sewer drainage systems including culverts, water areas, streams, areas subject to occasional flooding, marshy areas, and swamps. (Note: Detail design of drainage structures is not required for preliminary plan.)
- (e) The approximate areas subject to inundation or stormwater overflows from a 100-year storm.

II. Basic data used in hydrologic and hydraulic computations including:

- (a) Drainage area of all water courses.
- (b) Brief description of drainage area above the major drainage system including location of other subdivisions, dams, and reservoirs. Existing dams which are designated as low hazard may become high hazard structures with proposed developments.
- (c) Soils and cover information.
- (d) Roughness coefficients.
- (e) Profile showing the slope of the channel or thalweg\* of the stream. This information can be developed from the contour maps.
- (f) Typical valley cross-sections showing the stream channel, the flood plain adjoining each side of the channel, location of any proposed developments within the flood plain, and the elevation and discharge information for the 100-year flood.

Pertinent considerations for evaluation:

As a general guide, all channels with drainage areas over 1000 acres should be considered as a part of the major system and should be studied for flood potential. Drainage areas less than 1000 acres may be considered as part of the initial system wherein the runoff is controlled by storm sewers, streets, and land grading.

The general location of a flood plain along a natural water course can be mapped using soils information. To locate the 100-year flood or another frequency of flooding requires a hydrologic analyses.

There are many hydrology procedures used by planners in estimating peak discharge values. County subdivision regulations may or may not specify certain procedures. Discharge estimates will vary depending upon the selected hydrology procedure and personal judgement factors. There may be a seemingly large variance when comparing our estimated peak discharge values with those of the subdivider; however, the resulting difference in flood line elevations may be insignificant. Flood line elevations and locations are of primary importance. Significant differences between flood line locations shown on the preliminary plan as compared with the results of the SCS evaluation should be included in the review comments.

Damage from flooding is a function of flow depths and velocity. In appraising the flood damage potential, the magnitude and locations of velocities should be considered. Erosion and sediment deposition are good indicators of damage that has occurred in the past. Scouring action is usually confined to areas within the stream channel and around obstructions on the adjacent flood plain. Major damage may result from scouring, especially on streams with steep slopes.

In general, a velocity of four feet per second in a flood plain should not cause serious scour damage in unobstructed cross-section. However, velocities of four feet per second in depths of two or more feet might sweep persons off their feet, thereby creating a definite drowning hazard.



*Runoff from developed area is too much for existing channel.*



Frequently used rule of thumb is that the product of the depth of water and the velocity should not exceed seven for areas associated with human occupancy or habitation. Higher velocities may be permitted in other areas.

It should be remembered that the SCS is making a technical review regarding flood problems for the SCD Board. The review comments which are passed on to the Board of County Commissioners, are the comments of the SCD Board. It is essential that SCS keep a copy of all material that it furnishes to the SCD Board. The SCS is not responsible for providing boundaries of the 100-year flood lines on subdivision plans -- this is the subdividers responsibility, who in turn, is required by law to employ the services of a registered professional engineer to provide this information.

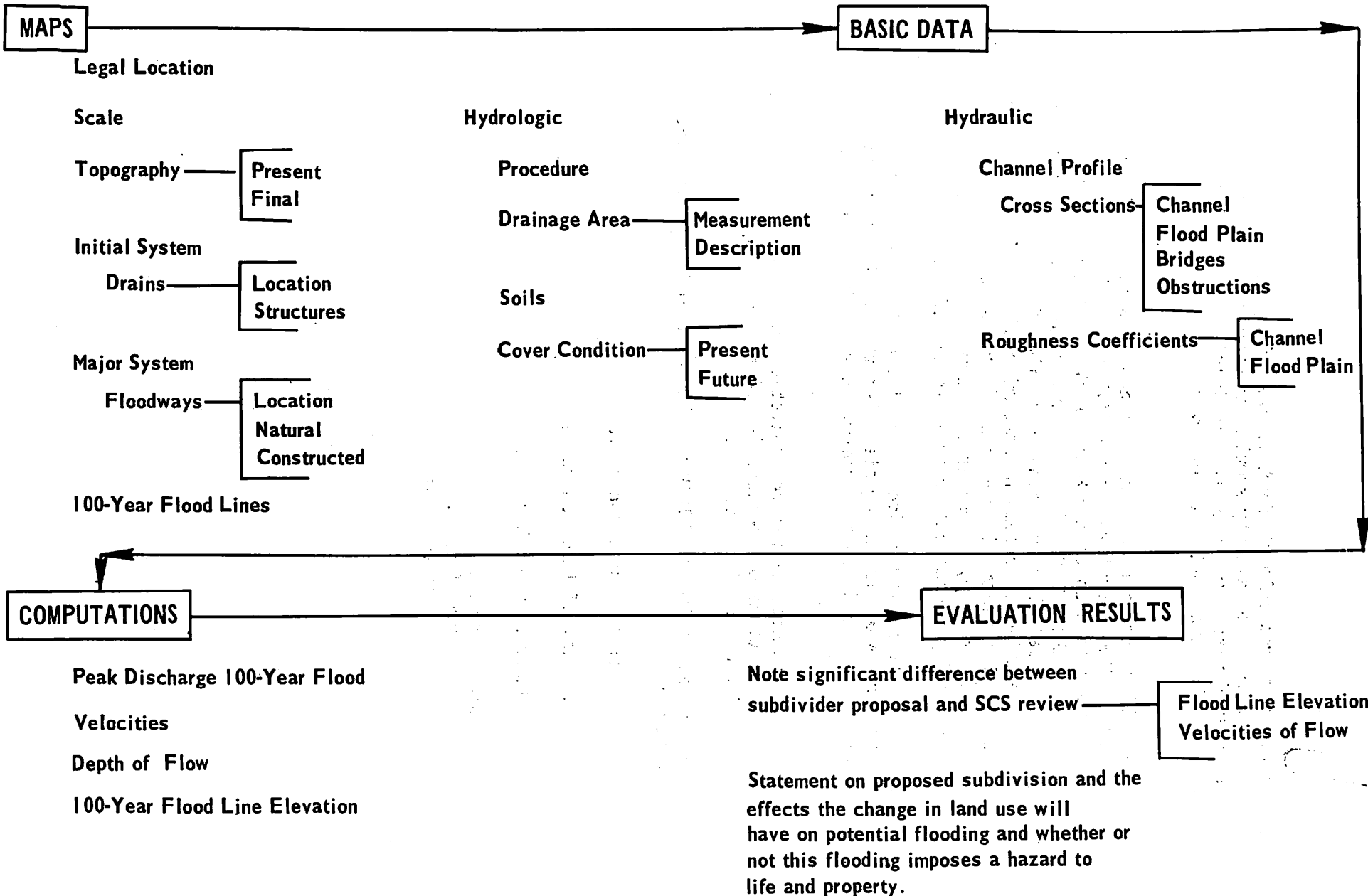
If during the review period, it is found that the basic data needed for review is inadequate, then the SCS through the SCD should request additional information from the Board of County Commissioners.

In some instances, it may be desirable for the SCS to survey a few cross-sections on location in order to make a technical review of the flooding problems.

Review comments to the SCD Board should include statements regarding:

- I. Adequacy of drainage system.
- II. Adequacy of flood channels.
- III. Potential flood hazards.
  - (a) Location.
  - (b) Depth of flow.
  - (c) Velocity of flow.

# FLOOD EVALUATION - CHECK LIST DIAGRAM





## 400 Engineering

### 410 General

If runoff water is not controlled while developing and after completion of subdivisions, excessive erosion and flood damage occurs. Rills and gullies are formed and sediment fills road ditches, drains, streams and ponds.

Inclusion of adequate conservation practices, grading operations and revegetation will control runoff and reduce flood and sediment damage during and after development.

All engineering aspects should be evaluated in our review of subdivision plans. Items to consider are soils limitations, drainage areas, and land grading which may cause excessive runoff and sediment. Soil types, slopes and size of drainage area as well as dams on water courses passing through the subdivisions are key factors to subdivision reviews.

### 420 Review Procedures

Whereas some subdivision plans may be of such a nature that an engineer need not be involved in the review of runoff characteristics, it is imperative that the Area Engineer assist with the more complex plans, involving large drainage areas and adverse soils.



*This site needs temporary protection such as mulch or vegetation.*



*Sediment from developing areas is a source of pollution.* SCS PHOTO 10-P1113-8

#### 430 Soil Problems

Most aspects of this problem have been dealt with in section 200. It should be recognized that areas designated as having severe soil limitations may be developed, but at significantly higher cost. Also, it may be possible by careful study to locate suitable sites which are within an area which generally has severe limitations.

Areas of high water table and poorly drained soils should have sub-surface drains around basements emptying into storm drains. A study of soils limitations will give guidance on the need for sub-surface drains. Included in the appendix are some drawings of typical drain installations.

Special comment should always be made when there are severe shrink-swell limitations. When soils are extremely tight, shallow, or have a high watertable, comments will be required for septic tank and leach fields unless areas are localized or central sewage systems are planned.

Soils limitations as to excavation and steep slopes generally require little additional comments.

Areas of potential flooding are identified in soil limitations. While these are not usually accurate enough to identify the 100-year zone, they will help indicate areas of needed study. Review these areas carefully before commenting. Reasons for all limitations should be given including discussion of possible effects on the subdivision.



## Appendix 2

### Procedures for Review of Preliminary Subdivision Plans

The attached flow chart was developed to graphically portray the normal procedures involved in the review of preliminary subdivision plans by Soil Conservation Districts.

The following information should be helpful in interpreting the flow chart:

#### Step One -

The land developer is subject to County Subdivision Regulations and must submit required data to the County Planning Commission. Usually, he must prepare a sketch plan, a preliminary plan, and a final plan. He may, or may not, be an SCD cooperator. Plan preparation is the land developer's responsibility. Data for his plan may come from a variety of sources including SCS, consultants, or his own staff.

#### Step Two -

The land developer prepares the preliminary plan according to requirements in the county subdivision regulations. The preliminary plan is usually developed after approval by the planning commission of the sketch plan. The sketch plan is generally a brief document, expressing the developer's intent.

#### Step Three -

The county planning commission receives the preliminary plan from the developer and determines that it contains the required information. It is then sent to reviewing agencies for comment. One of the reviewers is the SCD.

#### Step Four -

The SCD receives the preliminary plan and refers it to SCS for technical review.

#### Step Five -

SCS reviews the plan and submits a written report to the SCD. The SCS report indicates technical adequacy concerning those items for which the SCD is responsible.

#### Step Six -

The SCD evaluates SCS data and other sources of relevant information and prepares its comments and recommendations to the county planning commission.

Step Seven -

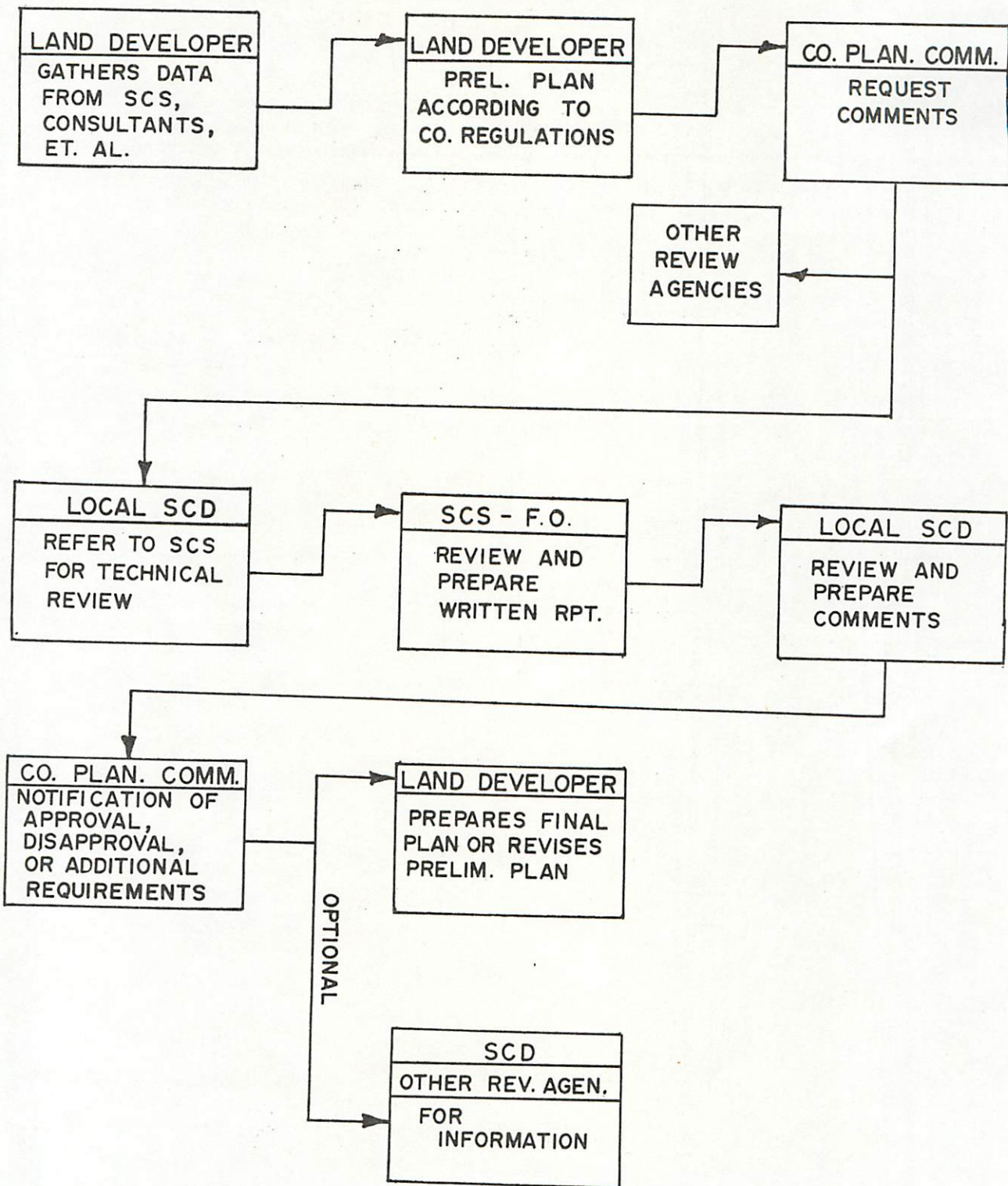
The county planning commission evaluates all review comments and decides whether to approve or disapprove the land developer's proposal. SCD supervisors may attend these meetings to explain the district's comments and to keep abreast of Planning Commission actions. The planning commission may defer the decision to the County Commission depending upon the particular county's authority delegation policy. The planning commission may return the plan to the developer for additional information or revision.

Step Eight -

The county planning commission informs the land developer of its decision and he proceeds accordingly. Many counties inform the reviewing agencies of their decisions.



# FLOW CHART OF PROCEDURES FOR REVIEW OF SUBDIVISION PRELIMINARY PLANS BY SCD'S



#### 440 Land Grading

Land grading causes many problems when not performed correctly or when areas are too large. Grading should proceed no further ahead of actual development than is absolutely necessary. Top soil should be replaced to aid revegetation which should be established as soon as possible. Special precautions are necessary in light and sandy soils.

#### 450 Hazard of Dams

If water courses passing through the subdivision have dams on them, they should be evaluated for the hazard to the subdivision if the dams should fail. We should also comment regarding failures.

Regrading and shaping of large natural channels make them more erosive and usually cause excessive channel velocity unless the channel is lined with heavy riprap or concrete. Excavated slopes should generally be 3:1 or flatter.

Road layout should generally follow natural contours.

Diversions, debris basins, retaining walls, terraces, berms, and vegetation should be used as needed to reduce sediment and runoff.

#### 460 Hydrology

Detailed hydrological consideration is covered in Section 300. Development of an area is almost certain to cause increased runoff and sediment. The possible adverse effects of such an increase should be analyzed. Items to be especially careful of are existing or planned bridge sizes and stability and capacity of existing and planned watercourses. It should be recognized that stable watercourses may become unstable when exposed to larger more frequent flows resulting from developments.

#### 470 Conservation Practices

All conservation practices proposed in subdivision plans shall be reviewed for soundness, considering the hazards involved and the needed life span.

Temporary protective measures require less capacity and may not need to meet all of our required standards and specifications; however, deviations should only be recommended after careful study.



## 500 Vegetation

### 510 General

The Statement of Purposes section of the Model Subdivision Regulations contains two purposes that relate directly to vegetative concerns: I-3 J "To preserve natural vegetation and cover and promote the natural beauty of the country." I-3 K "To prevent and control erosion, sedimentation and other pollution of surface and subsurface water."

In reviewing preliminary plans for adequacy of planning relating to vegetation two areas of concern must be considered:

1. Does the plan provide for adequate preservation of existing vegetation?
2. Are plans for revegetating disturbed areas adequate?

Since vegetative concerns are closely related to the two specified review responsibilities of districts (Soil Suitability and Flooding Problems) it is appropriate that vegetative aspects of the preliminary plan be reviewed and commented upon.

### 520 Protection of Existing Vegetation

While some kinds of plant cover can be restored, there are many which are almost irreplaceable once they are destroyed. Included among the situations where it is vitally important to save existing vegetation from destruction are:

- Streambank and stream bottom vegetation
- Trees, shrubs, grasses, and other plants on very steep slopes (2:1 and steeper).
- Plant cover on soils highly susceptible to wind erosion
- Plant cover on soils highly susceptible to gullying
- Other land areas which would be made into extremely critical areas once the native plant cover is destroyed

Any of the land cover conditions listed above should be clearly identified in subdivision plans. The plans should specify the intent to protect these areas from being seriously disturbed.

Districts should be encouraged to include in their comments the consequences of unnecessary destruction of existing vegetation. These might include:

1. Stream pollution through increased sediment yields.
2. Air pollution from wind borne particles.
3. Undesirable increased water yields into the drainage system.
4. Degradation of esthetic values.
5. Flood and sediment hazards to adjoining property.

### 530 Revegetation of Disturbed Areas

Where construction or traffic during construction will destroy or badly disturb plant cover, the preliminary plan should specify the steps to be taken to revegetate the denuded areas. Specifications should include species to be planted, time and method of planting, fertilizing and mulching requirements, and protection following planting. For meeting minimum needs, the reviewer should consult the standard and specification for Critical Area Planting in the Technical Guide.

The reviewer should pay special attention to the planned seedbed. Soil suitability and planned slopes are of primary importance. Slopes should not exceed 4:1 unless prohibited by site conditions. If feasible, top soil should be stockpiled and replaced over fill or cut areas.

In many areas, revegetation success depends upon the time of planting. If seeding is to be done at a time when sufficient natural rainfall is lacking, the plan should include provisions for irrigation to assure stand establishment.

Areas exposed to erosion for long periods of time before the recommended season of the year for permanently planting them should be protected by an interim or temporary cover. Such protective cover can be established from annual grain crops such as wheat and rye. Well applied mulching material in sufficient quantity can generally provide protection from erosion, but its protective value is not long lasting.

The consequences of inadequate revegetation are the same as indicated in 520 above.



## 600 Erosion Control Plan

### 610 General

In all subdivision preliminary plans reviewed, an appraisal should be made of erosion hazards.

If, in the opinion of the reviewing technician, disturbances will occur that require planned erosion control measures, the preliminary plans should contain an erosion control plan.

When an erosion control plan is deemed necessary, but is not included in the preliminary plan, SCD boards should be encouraged to inform the county planning commission of the need.

When an erosion control plan is included in the preliminary plan, it should be reviewed carefully to determine its adequacy. If the reviewing technician considers the erosion control plan inadequate his report to the SCD board should identify the deficiencies and the board should be encouraged to include this information in its comments to the county planning commission.

### 620 Need for Erosion Control Plan

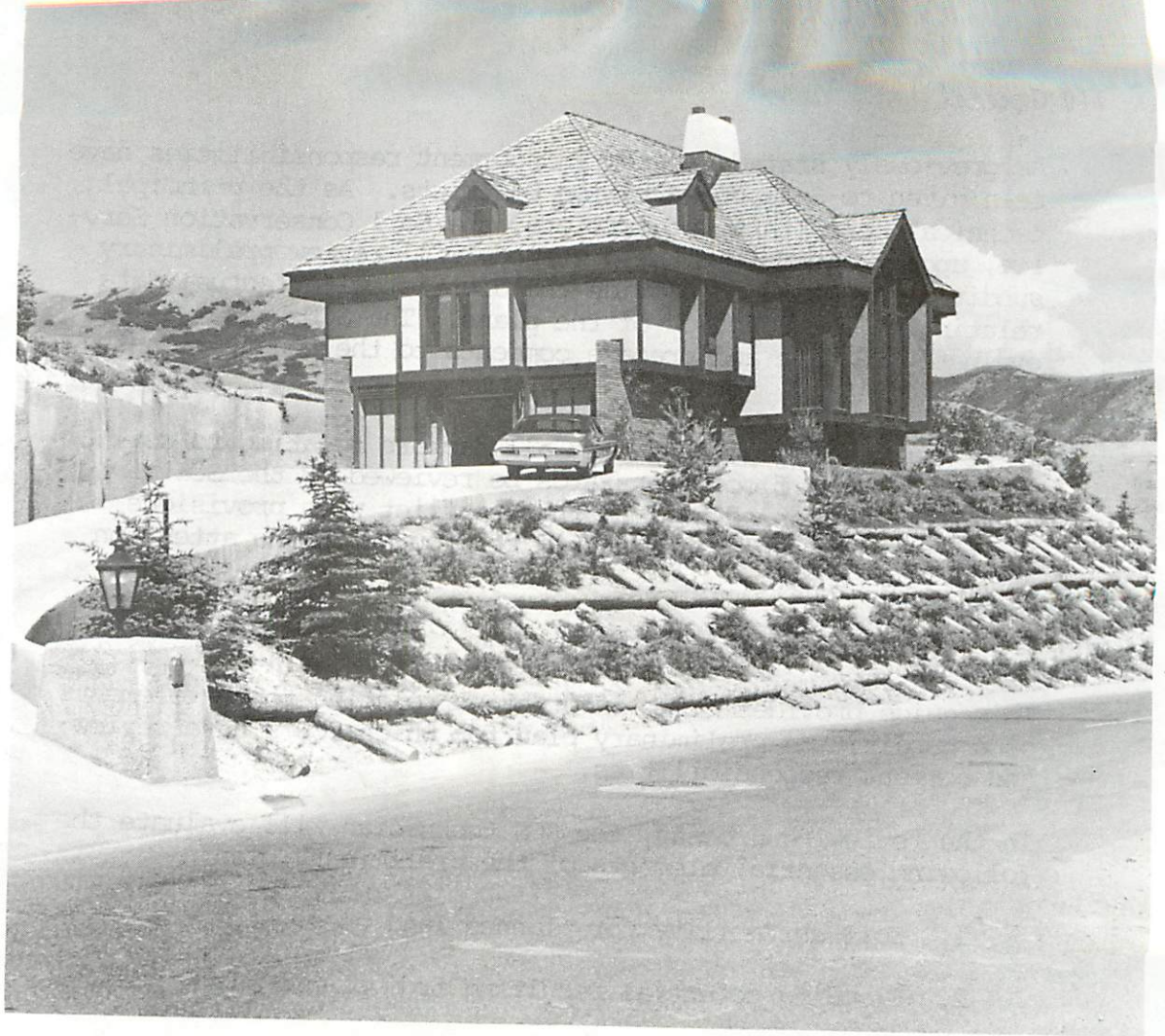
SCS technicians should have no trouble identifying the need for an erosion control plan. Planned changes in land use that create surface disturbances resulting in significant erosion hazards generally indicate the need for planned erosion control measures. It is recognized that good judgment will be required to determine whether or not the magnitude of disturbance is significant enough to warrant an erosion control plan.

In determining the need for an erosion control plan the reviewer should project the anticipated erosion potential should a high intensity storm or wind occur during the period of disturbed land exposure. Natural site factors including soil properties, slope, and drainage conditions will require careful evaluation. Anticipated off site erosion should be considered where land use changes will increase water discharges into drainage channels.

### 630 Adequacy of Erosion Control Plan

The erosion control plan should include all necessary erosion control measures to assure that erosion and sediment yields will be held to acceptable limits.





*Some site limitations can be overcome with proper design.*

SCS PHOTO ORC 298 1-3-4-6-7

The plan should include, as appropriate, provisions for temporary protection during construction and for permanent type practices having long term effects. It should provide for both on-site and off-site protection.

The reviewer should evaluate important site factors including soils, slopes, and drainage conditions to ascertain that the proper vegetative and structural practices are planned. Practices should meet the minimum requirements contained in field office technical guides.

Where needed practices are not included in the erosion control plan, SCD's should be encouraged to make appropriate recommendations to the county planning commissions.



700 comment Preparation

710 General

As previously stated, review and comment responsibilities have been given to Soil Conservation Districts. As the principal technical consultant to districts, the Soil Conservation Service, upon request from the district, will review preliminary subdivision plans and provide the district with factual data relating to the adequacy of the plans. The SCD board will evaluate SCS data and prepare comments to the county planning commission.

It is extremely important that all factors relating to soil suitability and flooding hazards be reviewed by the SCS technician. Any planned actions that conflict with provisions of the county regulations should be brought to the attention of the SCD board.

#### 720 SCS Review of Subdivision Plans

This guide provides basic information relating to the elements of a subdivision preliminary plan for which SCD's have review and comment responsibilities.

In the reviewing process, the SCS technician will evaluate the following essential elements of the preliminary plan:

1. Soil suitability for planned land uses.
2. Flooding potential resulting from planned land uses.
3. Adequacy of the planned drainage system.
4. Adequacy of engineering practices.
5. Vegetative protection and restoration plans.
6. Adequacy of erosion control plan.

The District Conservationist should assign review responsibility to competent technicians. Complex preliminary plans may require review by interdisciplinary staff at the area or state level.

Full use should be made of technical guides and other information available at the field office.

Districts should be encouraged to review the preliminary plan and not base their comments entirely on SCS reports.

I. Washington SCS Memorandums

Administrator's General Memo-6  
Engineering and Plant Science Assistance for Soil and Water Conservation  
in Urban Areas, April 9, 1971.

Conservation Planning Memo-12 & Supplement -1  
Policy and Guidelines for Assistance in Land Use and Conservation Treat-  
ment Regulations, October 15, 1971, August 25, 1972.

Engineering Memo-3 (Rev.2)  
Services of Private Engineers in Soil Conservation Service Programs,  
August 5, 1964

Soils Memo-9  
Soil Survey Interpretations, October 6, 1955

Soils Memo-22  
Land Capability Classification, May 19, 1958

Soils Memo-26

730 SCS Report to SCD

After review of the preliminary plan by SCS, a written report  
will be made to the SCD.

The report will be limited to those technical aspects pre-  
sented in this guide for which the Service has expertise.

All reports must be based on factual data and be objective in  
nature. Interpretations and projections of cause-effect rela-  
tionships must be based on sound technical information.

Reports will be prepared in language understandable by the  
layman. Long technical soil descriptions and vague reference  
to broad limitation categories must be avoided.

Do not use terms such as "severe limitations" or "moderate  
limitations". Describe the entire soil characteristic and  
its specific effect on the proposed use, i.e. the soil is  
less than 30" deep over shale and septic tank effluent will  
rise to the surface.

Where soils limitations preclude the planned land use, the  
report should so state and include a description of the condi-  
tions prohibiting the land use. Where severe limitations  
exist, but may be overcome through proper design or treatment,  
the limitations should be described and the need for special  
design or treatment included in this report.



Wind erosion causes problems. SCS PHOTO 10-P57-5



1. Administrative Documents

Administrator's General Memo-6  
Engineering and Plant Science Assistance for Soil and Water Conservation  
in Urban Areas, April 9, 1971.

Conservation Planning Memo-12 & Supplement -1  
Policy and Guidelines for Assistance in Land Use and Conservation  
near Wetlands, October 18, 1971, August 25, 1972.

Engineering Memo-3 (Rev. 2)  
Review of Private Engineers in Soil Conservation Service Programs  
August 2, 1964

Soils Memo-9  
Soil Survey Interpretations, October 6, 1955

Soils Memo-22  
Land Capability Classification, May 19, 1958

Soils Memo-26  
Developing Soil-Woodland Interpretations, September 7, 1967

Soils Memo-37 (Rev. 2)  
Soil Surveys for Community Planning and Resource Development in Areas  
of Rapid Expansion of Population and Industry, April 17, 1966

Soils Memo-69  
Soil Surveys - Soil Interpretations for Recreation, October 17, 1966

2. Field Office Technical Guides

Section I - Maps, Inventories, List of Problems

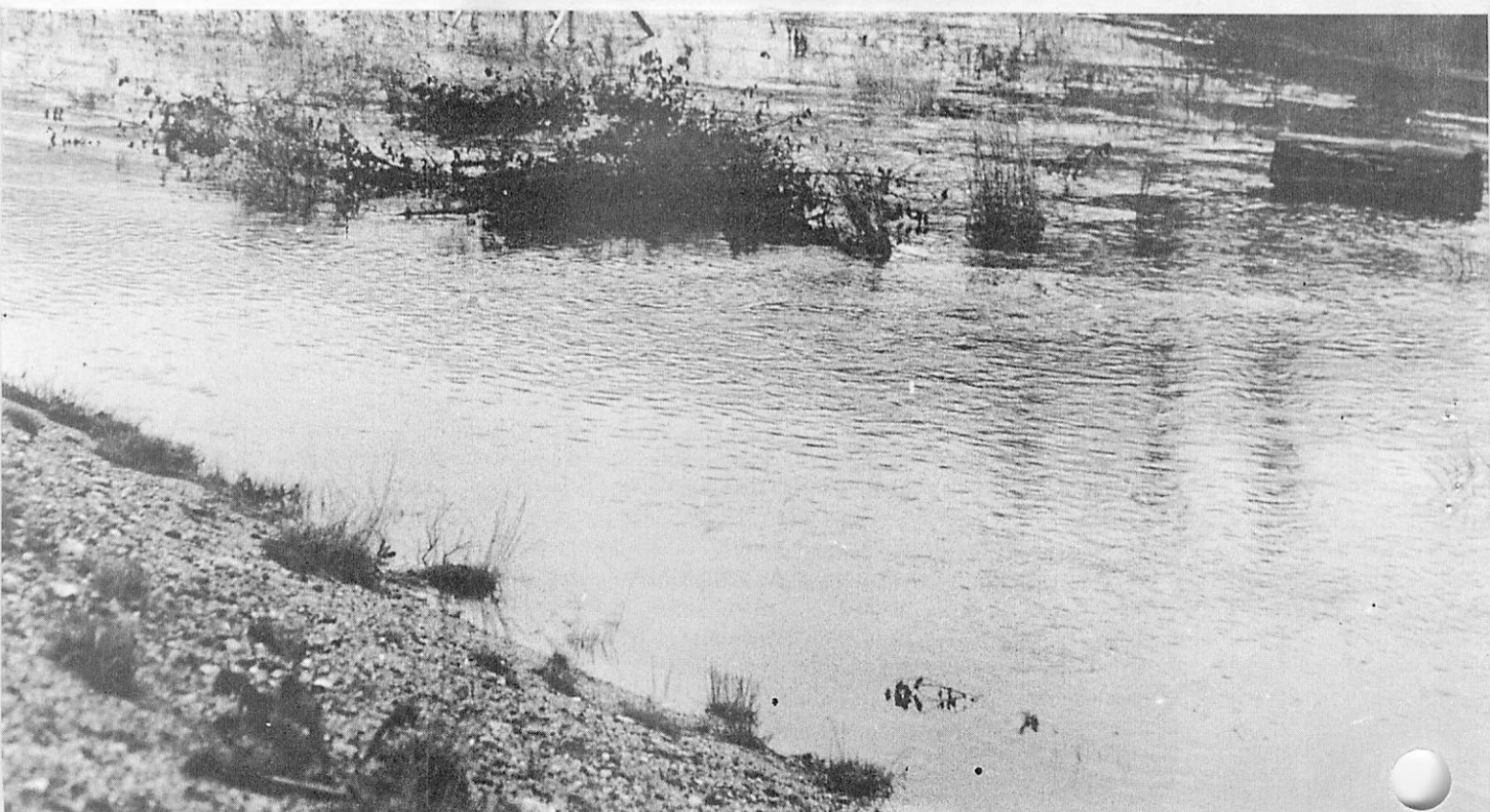
Section II - Soil and Site Information

Section III - Land Use and Treatment Alternatives

Section IV - Location Standards and Specifications

Section V - Conservation Planning Handbook

Handbook for Developing Land Plans in Coastal, Lake, and Mountain Areas



Floodplains make poor homesites. SCS PHOTO N. H. 171

After review of the preliminary plan by SCS, a written report will be made to the SCD.

The report will be limited to those technical aspects presented in this guide for which the Service has expertise.

All reports must be based on factual data and be objective in nature. Interpretations and projections of cause-effect relationships must be based on sound technical information.

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*Wind erosion causes problems.* SCS PHOTO 10-P57-5



*Floodplains make poor homesites.* SCS PHOTO N. H. 171



## Appendix I

### Sources of Information Relating to Subdivisions

#### I. Washington SCS Memorandums

Administrator's General Memo-6

Engineering and Plant Science Assistance for Soil and Water Conservation in Urban Areas, April 9, 1971.

Conservation Planning Memo-12 & Supplement -1

Policy and Guidelines for Assistance in Land Use and Conservation Treatment Regulations, October 15, 1971, August 25, 1972.

Engineering Memo-3 (Rev.2)

Services of Private Engineers in Soil Conservation Service Programs, August 5, 1964

Soils Memo-9

Soil Survey Interpretations, October 6, 1955

Soils Memo-22

Land Capability Classification, May 19, 1958

Soils Memo-26

Developing Soil-Woodland Interpretations, September 7, 1967

Soils Memo-37 (Rev. 2)

Soil Surveys for Community Planning and Resource Development in Areas of Rapid Expansion of Population and Industry, April 17, 1968

Soils Memo-69

Soil Surveys - Soil Interpretations for Recreation, October 17, 1968

Field Office Technical Guides

Section I - Maps, Inventories, List of Manuals

Section II - Soil and Site Information

Section III - Land Use and Treatment Alternatives

Section IV - Practice Standards and Specifications

Resource Conservation Planning Handbook

Procedures for Determining Peak Flows in Colorado, USDA, SCS, December 1972.

